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For Immediate Release

SRNL Innovation Contributes to Clemson University's Wind Turbine Drivetrain Testing Facility and Electrical Grid Simulator

AIKEN, S.C. (November 21, 2013) – The Savannah River National Laboratory (SRNL) is proud to be part of Clemson University's new Wind Turbine Drivetrain Testing Facility and Electrical Grid Laboratory. This public-private collaboration in electrical energy research, education and testing will be capable of full-scale, highly accelerated testing of next-generation wind turbine technology. The Electrical Grid Lab's 15MW Hardware-in-the-Loop simulator will allow manufacturers to test both the mechanical and electrical characteristics of their machines in a controlled and calibrated environment. The grid simulator will be the highest power experimental utility-scale facility in the world, combining testing of energy sources with advanced power instruments and systems.

In 2009, the US Department of Energy's Office of Energy Efficiency and Renewable Energy awarded a $45 million grant to Clemson to design, build and operate a facility capable of full-scale, highly accelerated testing of next-generation wind turbine drivetrain technology. In evaluating this new concept, the proposal was taken one step further by creating the Electrical Grid Laboratory Simulator that would not only serve wind power, but the entire electrical industry.

SRNL researcher and Advisory Engineer Joe Cordaro was part of the original Clemson-led team that developed the proposal for the Drive Train Test Facility and was integral to the effort that subsequently added the 15MW Electrical Grid Lab. SRNL has a critical role for both the Drive Train Test Facility and Electrical Grid Lab. "To see these facilities be built from the ground up has been amazing. The scale of the test rigs, power amplifiers and switch gear is inspiring to see. The Drive Train Test Facility will allow companies to perfect designs of very large high powered wind turbines by not only applying the massive torque loads under laboratory conditions, but also by testing gear boxes and bearings using a dynamic load applicator that can mimic changing wind conditions," said Cordaro. "The 15MW Electrical Grid Lab supports all types of energy and is the type of facility that it essential as the US modernizes the nation's electrical grid."

In parallel with the design of the Electrical Grid Lab, SRNL initiated a DOE Laboratory Directed Research and Development Project to implement Hardware-in-the-Loop technology with a Real Time Digital Simulation system for the US High Current Laboratory at the Savannah River Site. It then collaborated with Clemson in the initial concept of the Electrical Grid Lab and was responsible for the design of the data acquisition and control system. SRNL designed the hardware and software to be compatible with the Drivetrain Testing Facility systems and with the ability to link systems together. SRNL also designed the grid monitoring systems.

The Electrical Grid Laboratory will allow for systems testing for novel energy designs and approaches, such as using ultra-secure wireless sensor to monitor the nation's electrical grid, and will facilitate development and testing of the next generation cyber security systems for the US grid. With the Electrical Grid Simulator, companies can reduce risk by testing and demonstrating new technology under a controlled laboratory environment at utility scale power levels. This laboratory also provides the ability to perform electrical testing of low voltage and zero voltage ride-through at the multi-megawatt level. SRNL will also maintain an office for Research and Development at the Grid Lab.

The electrical transmission infrastructure in the US needs to be updated to improve efficiency, reliability and security. Central to that update is the development and certification of new technologies that can be added into the existing electrical grid and meet this challenge. This new facility allows for a paradigm shift that puts real hardware to the test in providing a high fidelity independent capability for testing, validating, and certifying new electrical power system technology without the risk of service disruption or grid collapse.

The Clemson Wind Turbine Drivetrain Testing Facility and grid simulator positions South Carolina as a world leader in the development and integration of new energy systems and will be an invaluable tool in developing cyber security approaches for ensuring the sanctity of power systems. It is through innovative thinking that researchers realized this unique opportunity that would allow for the advancement of wind energy and improvement of the nation's infrastructure.

The Savannah River National Laboratory is a multi-program applied research and development laboratory for the U.S. Department of Energy. SRNL applies state-of-the-art science and engineering to provide practical, high-value, cost-effective solutions for our nation's environmental cleanup, nuclear security and clean energy challenges. For more information, visit http://srnl.doe.gov.

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